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(54) TELEPHONE HANDSET

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ABSTRACT OF THE DISCLOSURE

Pushbutton Telephone Handset

A single hand operated telephone handset contains a keyboard with pushbuttons. The pushbuttons are arranged in groups so that each group is within tactile distance of a finger of the hand holding the handset. Grooves in the body of the handset are used for aligning the fingers of the hand with the grouped pushbuttons. The fingers dart out consecutively from the aligned positions to depress the pushbuttons thereby permitting blind manipulation of the handset.

The present invention relates to key-in-handset telephone instruments and more particularly to improvements in the housing structure of such telephones, and the resultant advantageous ways of using the handsat.

Key-in-handset telephones are known in the art as shown, for example, on the back cover of the "Bell Laboratories Record", September 1974 issue. The handset contains a transmitting unit, a receiving unit and a calling arrangement consisting of twelve pushbuttons and a recall button. During operation the set is held in one hand while the station numbers are keyed into it with the other hand.

Inadvertant depression of the pushbuttons must be avoided to prevent interruptions in the calling operation. This latter problem has been overcome in Canadian Patent 700,088 by R.E. Prescott and E. Watkins which issued on December 15, 1964. The pushbuttons are recessed in the handset and vertical ridges between three columns of keys prevent false operation of the keys while the handset is held during a call.

The above mentioned handsets are relatively bulky and therefore awkward to hold in comparison with the popular and widely used handset containing receiving and transmitting units only. A model of this handset is shown in the top left hand corner of the back page in the aforementioned issue of "Bell Laboratories Record", September 1974.

A common procedure for making a call with known key-in-handset telephones comprises holding the handset in one hand, looking for and remembering a 7 digit telephone number, looking at the keys in the face plate of the telephone, and keying-in the desired number with the other hand. Thus known handsets require the full attention of an operator who

is making the call.

In comparison, this disclosure describes a handset which is held in one hand and the keys are manipulated with the same hand. The operator's eyes and other hand are thereby freed from the keying-in-operation. The eyes can, for example, remain fixed during the entire calling procedure on a written number to be keyed-in the handset. Memorization of a telephone number is therefore not required for speed and accuracy in the keying-in operation. The other free hand can be employed during the operation to indicate the location of the printed telephone number.

If the entire telephone number is memorized before calling, the eyes and the other hand are not needed to make a call. Some skill is required with the fingers in keying-in a number. The arrangement of the keys in the handset permits blind manipulation of the keys.

An object of this invention is to provide a key-in-handset telephone which requires only one hand to support it and simultaneously operate the keys with the fingers of the one hand.

More specifically the invention provides a telephone handset comprising in combination an elongated portion between transmitter and receiver for being held in one hand, pushbuttons extending from said portion for actuating contacts and index means which register the fingers of said one hand with preselected groups of said pushbuttons, each of said groups having the contacts of said pushbuttons actuated by one of said registered fingers during the same holding operation.

According to another aspect of the invention there is provided a handset comprising a housing with a narrow

portion of such a length and section to be grasped in a hand, a sequence of pushbuttons arranged in rows, said rows forming pairs of said pushbuttons across said narrow portion, said pushbuttons spaced apart for the fingers of said hand to fall in registration over said pushbuttons when the handset is being grasped by said hand and one of said fingers falling into said narrow portion between two pairs of pushbuttons.

According to another aspect of the invention there is provided a single hand operated handset having elongated sides joined together to be grasped by said hand and having buttons arranged in groups for alignment with different fingers of said hand, said buttons having a separation so that each of said fingers is operating a button in a pro-selected one of said groups of buttons.

More specifically the invention provides a telephone handset for blind manipulation with one hand, having a transmitter, a receiver, and an elongated portion therebetween for being grasped by said hand, pushbuttons for actuating contacts extending from the elongated portion and aligned in at least one column along the elongated portion, the pushbuttons havinga fingerwide spacing along said column and located within tactile distance of the fingers of said one hand, while said one hand is holding said elongated portion with said fingers substantially perpendicular to said column.

Prealignment of the fingers with pushbuttons in the immediate vicinity of the location where the fingers rest while grasping the handset is facilitated by indexing grooves in the elongated portion. Prealignment through registration of the fingers with these grooves ensures that the fingers are within tactile distance of a predetermined number of pushbuttons.

The invention will now be described in greater detail with reference to the accompanying drawings, in which:

FIGURE 1 shows a front view of a telephone key-in-handset and the operation thereof in accordance with one embodiment of the invention;

FIGURE 2 is a sideview of a handset of Figure 1 partly in section in accordance with one embodiment of the invention;

FIGURE 3 is a front view of a handset showing the mounting arrangement of the faceplate in accordance with one embodiment of the invention.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings which are not drawn to scale. Figure 1 shows a telephone key-in-handset revealing an elongated body portion 11 having a first raised end portion 12 housing a receiver (not shown) and a second raised end portion 13 having a transmitter (not shown). Both end portions are accessible through removable covers 14 and 15 at end portions 12 and 13 respectively which are of the turn on type. The central part of the body portion 11 has a smooth and slightly convex back side 16 and a front side 17 containing face plate 18.

The faceplate contains ten movably mounted pushbutton keys 19 which are arranged in two columns of 5 pushbuttons each. The pushbuttons are further arranged into two clusters of 4 and 6 each, which are separated by finger space 20 on the faceplate.

In order to provide a firm grip of the handset by hand 21 the middle finger can be placed substantially around the finger space 20 as shown. The remining finger tips are placed across the front side of the body portion without

depressing any pushbuttons, as is described in detail further on. Another function of finger space 20 is to align the fingers in an initial position along groups of pushbuttons in the body portion 11 of the handset.

Although the present example is showing the finger space 20 for the middle finger it is understood that the present example is for illustration only and that the finger space can be provided at other locations as, for example, the first two and last eight pushbuttons so as to provide a space for the index finger. Another alternative configuration is to provide a uniform spacing between each row of pushbuttons without any finger space. The finger space 20 in the preferred embodiment of the drawings was found to provide good support during manipulation of the handset and division of the pushbuttons into two groups provides easier aligning of the fingers with the pushbuttons 19.

The preferred mode of operation of the pushbuttons is for the index finger to depress the first row of pushbuttons indicated as numbers 1 and 2 in Figure 1. The middle finger operates the second and third row of pushbuttons, the second row being in the upper cluster and the third row in the lower cluster of pushbuttons adjacent the finger space. The fourth finger operates the fourth row of pushbuttons and the fifth finger operates the fifth or bottom row of pushbuttons. In this configuration a minimum amount of movement is required for each finger from its normal or initial position, without need for the lateral movement of the handset in the palm of the hand. During manipulation of the ten digital keys the thumb 17 of the hand rests against the raised end portion 12 either from the side or from below as shown in the drawing to support the handset in conjunction with other

parts of the hand.

When the middle finger is used to operate the second and third rows of pushbuttons the handset is supported by some or all of the remining fingers resting against the side or front plate of the body portion, the thumb and partly by the palm of the hand depending on the size of the operators hand and the skill and habit of the operator. There are sufficient support points around the handset to provide a steady hold on the handset provided that it is not too big, overly heavy, or unevenly balanced.

The movably mounted pushbutton keys are surrounded by a U-shaped outer ridge 12 around the upper and lower group of pushbuttons in order to protect the pushbuttons from being depressed inadvertantly by a finger which is placed across the face plate. Depression of teh pushbuttons is possible by using the tip of a finger. A central ridge 22 is located between two columns of buttons. The height of the central ridge is less than the height of the outer ridges. The central ridge must be high enough to provide protection from inadwertant depression of the buttons but also permit depression of the buttons located in the column closest to the wrist of the hand. The angle between the fingers and the keys is greater for this column of keys as the fingers are extended further than for the first column of keys.

The operation of the handset proceeds with one hand reaching for the handset, with the fingers grasping the central portion of it. The fingers become aligned with the pushbuttons through the indexing finger space. An operator can now devote his whole attention to the number to be keyed in since it becomes an automatic procedure with some practice and knowledge of the location of the keys. The number is

keyed-in sequentially into the handset either from memory or by keeping the eyes fixed on a written number without ever having to look at the handset to check for finger positioning. Each finger has to operate a number of designated keyes similar to blind typing as mentioned above. Errors due to misdialling are thus much less likely to occur due to the greater attention paid to the number and the automatic manner of depressing the keys. A number with only a few digits can be keyed into the handset even before it is fully moved from the handset base to the operator's ear, if desired.

A very simple form that a handset can take is for each finger of the hand to operate one pushbutton only. If telephone handsets contain four buttons only instead of ten, greater economy, speed and accuracy can be obtained in the following manner. In most localities a telephone number has seven numerals. If these numerals contain the digits zero, one, two and three, the total number of different seven numeral numbers is about three million. This compares with about nine million different numbers for seven digit numerals having ten different digits. If three million is an insufficient number of different telephones in a particular locality an eight digit can be added. The simplicity of operation of the present invention outweighs the extra labour involved in keying-in an extra digit on the keyboard.

The present invention is particularly useful to a person who is making frequent calls. If desired, the handset can be placed in the palm of one hand and keyed-in with the other hand as in the operation of prior art handsets. The handset can be operated by right or left handed persons since the handle is symmetrical.

Figure 2 shows a side view of the handset with a

portion 24 thereof broken away in order to show more detail.

The pushbuttons 19 in the faceplate 18 are recessed below the outer ridge 12 and the central ridge 22. Finger space 20 is recessed below the ridges. Numberal 23 indicates a concave curvature in the transmitting end of the housing to provide ample space for placing the thumb of the hand against the housing.

When a pushbutton is operated by a finger it may be desirable to know when the button has been depressed sufficiently for the number to be keyed-in. Normally the pushbutton it depressed as far as possible but at times only a partial depression may occur leaving an operator uncertain if the required number has been keyed-in. To make the operator instantly aware of partial depressions, and thereby to avoid errors in the conneciton, the pushbutton means can be mounted in the handset with a variable force arrangement such that when the contacts below the buttons have been actuated the outward force acting on the button suddenly decreases signifying sufficient travel by the pushbutton for the number to be keyed-in the handset.

An embodiment of such pushbutton arrangement is provided by a coiled spring pressing against the button at one end and against a back plate at the other end. When the button is depressed it will engage a pin after a fixed length of travel and push it a certain distance along with the motion of the button. This force of the pin is translated to a backplate releasing mechanism which causes the coiled spring to extend suddenly thereby reducing the compressive force oe the button. This change of force is felt by the finger activating the pushbutton. The tactile indication means is shown by numeral 30 in Figure 2 of the drawings.

Figure 3 of the drawings shows the handset with the face plate removed. The central body portion is sufficiently narrow to enable a firm grasp by one hand. The body portion must be wide enough to contain the electrical circuitry. Opening 26 in the central portion of the handset permits the introduction and assembly of the electronic circuitry into the body. The face plate rests on rongues 27. Screws (not shown) are inserted through the face plate into openings 28 of the tongues thereby anchoring the plate to the body.

The above arrangement hides the joint between the face plate and the body from contact with the operator's hand thereby providing more convenient handling of the handset. Only a small region 29 at the finger space has a joint exposed to the index finger.

In view of the limited volume which is available inside of the handset for the circuitry it is preferable to have an all electronic circuit for the pushbuttons. The common switch and the pushbutton switches are preferably made of solid state switches because of the desireable smaller size compared with electromechanical switches.

The handset may be used on present commonly used switchhooks such as on desk or wall bases. In the desk base the two recall buttons located in the handset receptacle may have to be somewhat longer in order to act on the recessed central ridge of the present handset.

In order to further improve the alignment of the fingers with the keys, the handset can have slight indentations along the side of the handle of the body portion or on the ridges in line with the horizontal position of the keys. The indentations serve as a guide for the fingers to indicate the location of the pushbuttons. See numeral 31 in

Figures 1 to 3.

Since the index means register the fingers in line with groups of pushbutton keys a convenient center to center spacing is a finger's width or about 5/8 to 7/8 of an inch in order to prevent interference of different fingers with each other. Furthermore, the number of pushbutton keys need not be limited to 10 but can be more but preferably less for easy manipulation of the keyboard. The natural movement of a finger is in a plane perpendicular to the palm of the hand from when the fingers are in an outstretched position to a position when the hand forms a fist. Except for the thumb lateral movement of the fingers in other directions is limited.

The handset as described is obviously very advantageous to use by blind persons. Furthermore, a telephone of the present invention which is installed in an automobile takes a minimal amount of distraction from an operator of the moving vehicle.

This completes the description of the preferred embodiment of the invention disclosed herein. However, many modifications thereof will be apparent to persons skilled in the art without departing from the spirit and scope of this invention. For example, any desired layout of structure may be formed with this invention. The invention may be used in the production of toys for children in which audible sounds are produced when the pushbuttons are depressed, such apparatus may be manufactured without the sound transducers at either end of the handle. Accordingly, it is contemplated that this invention be not limited to the particular details of the embodiments disclosed herein, except as defined by the appended claims.

The embodiments of the invention in which an exclusive property or priviledge is claimed are defined as follows:

1. A telephone handset for blind manipulation with one hand, said handset having a transmitter and a receiver, comprising in combination:

an elongated portion between said transmitter and receiver for being grasped by said hand;

pushbuttons for actuating contacts extending from said portion and aligned in at least one column along said elongated portion;

said pushbuttons having a fingerwide spacing along said column and located within tactile distance of the fingers of said one hand while said one hand is holding said elongated portion with said fingers substantially perpendicular to said column.

2. The telephone handset as claimed in claim 1, in which said pushbuttons are aligned in two adjacent columns having a fingerwide spacing.

3. The telephone handset as claimed in claim 2, said elongated portion having indexing grooves for prealigning said fingers within tactile distance of predetermined pushbuttons.

4. The telephone handset as claimed in claim 3, having ten pushbuttons, in which said indexing grooves provide for prealignment of the index finger with a first pair of pushbuttons, the middle finger with a second and

third pair of pushbuttons, the ring finger with a fourth pair of pushbuttons, and the little finger of said hand with a fifth pair of pushbuttons each of said pairs of pushbuttons comprising a pushbutton fromthe first and second columns.

5. The telephone handset as claimed in claim 4, in which said second and third pairs of pushbuttons have a fingerwide groove therebetween.

6. The telephone handset as claimed in claim 5, in which said fingerwide spacing is from 5/8 to 7/8 inches.

7. The telephone handset as claimed in claim 6, in which said pushbuttons have tactile indication means for indicating the activation of said contacts.

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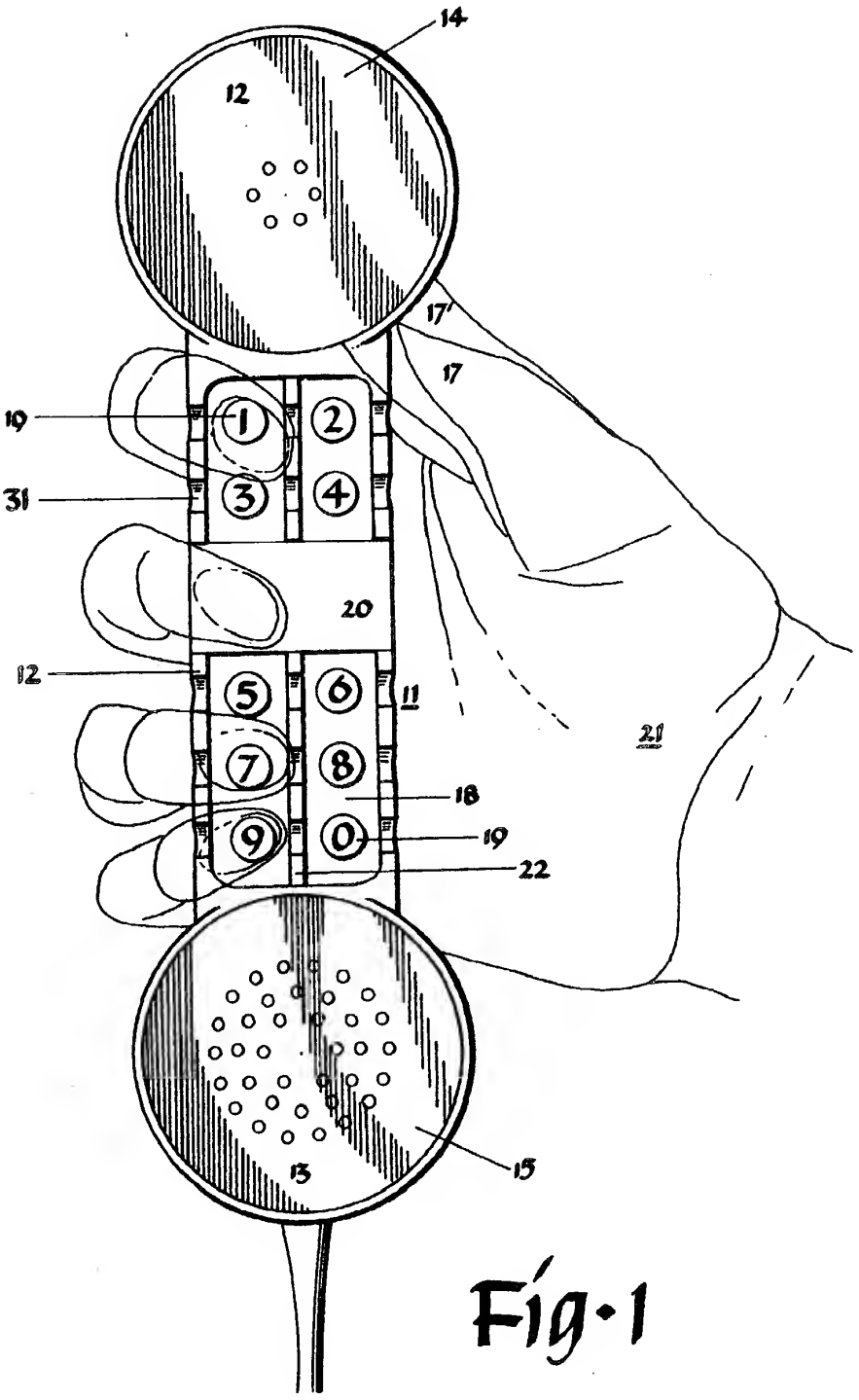

Fig. 1

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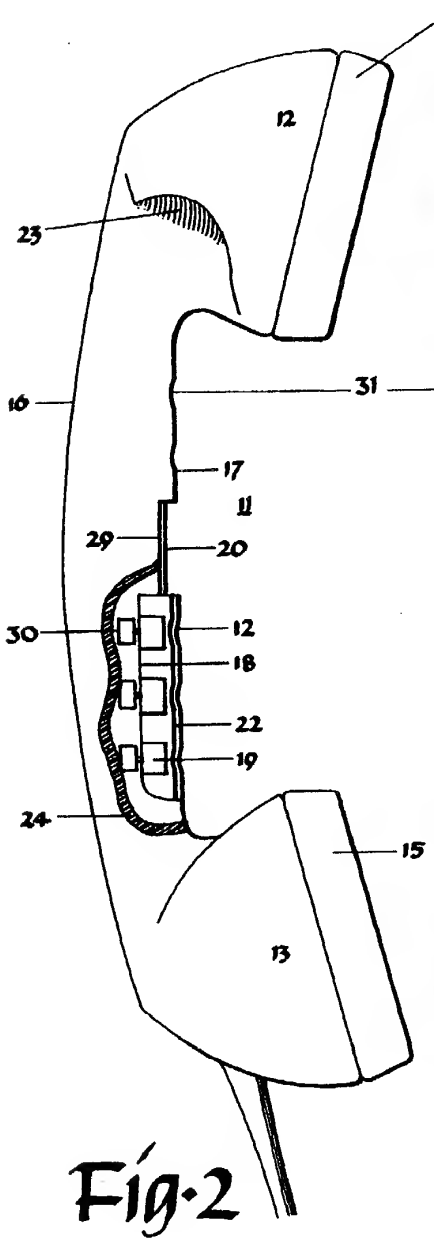
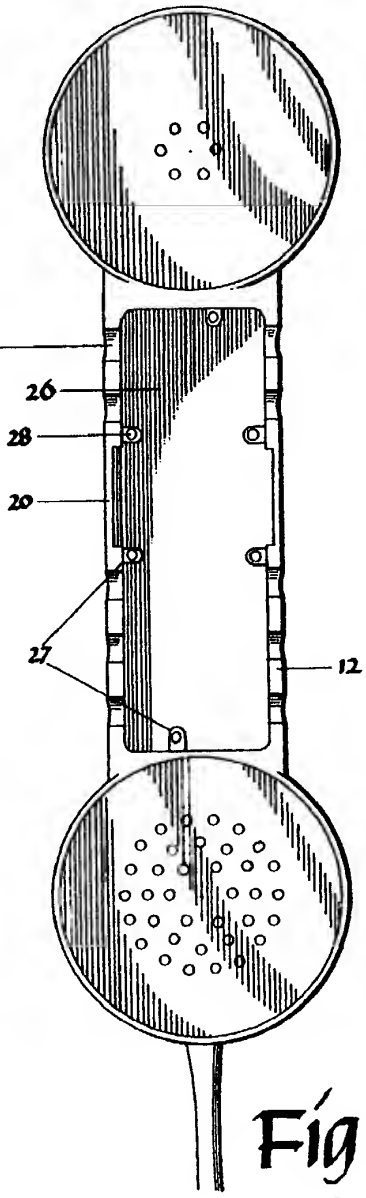


Fig·2



Fig·3

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